



June 1, 2011

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Ex Parte

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Promoting Expanded Opportunities for Radio Experimentation and Market Trials under Part 5 of the Commission's Rules and Streamlining Other Related Rules, ET Docket No. 10-236; 2006 Biennial Review of Telecommunications Regulations – Part 2 Administered by the Office of Engineering and Technology (OET), ET Docket No. 06-105

Dear Ms. Dortch:

Yesterday, Richard Harvey of Verizon, Michael Samsock of Verizon Wireless, Sean Haynberg of VComm, and the undersigned met with Geraldine Matise, James Burtle, Rodney Small, and James Miller of the Office of Engineering & Technology to discuss the November 30, 2010 Notice of Proposed Rulemaking in the above-captioned proceedings. We explained that CMRS spectrum is ill-suited for the research program experimental licenses proposed in the NPRM and that experimental applicants must coordinate with and seek consent from CMRS licensees in order to protect commercial wireless services from harmful interference. The attached presentation was distributed at the meeting.

This letter is being filed electronically pursuant to Section 1.1206 of the Commission's Rules. Should you have any questions regarding this letter, please contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read "Tamara Preiss".

Attachment

cc: (via e-mail)
Geraldine Matise
James Burtle
Rodney Small
James Miller



Research Program Experimental Radio Licenses and CMRS Spectrum

Sean Haynberg – Director RF Technologies

May 31, 2011

Overview

- Proposed Program Experimental Licenses
- Research Program Experimental Licenses are Ill-Suited for CMRS Spectrum
- Coordination and Consent are Critical
- Power Flux Density Limits Will Not Protect CMRS
- Suitable Bands for Radio Experimentation
- Market Trials of Experimental Equipment
- Summary

Proposed Program Experimental Licenses

- NPRM proposes new types of experimental radio licenses
 - Research Program Experimental Radio Licenses – for Universities and Medical Facilities
 - Innovative Zone Program Experimental Radio Licenses – for unused spectrum bands
- Herein, we address the Research Program Experimental Radio Licenses and applicability in CMRS bands
 - We do not address the Innovative Zone Program Experimental License, or the conventional experimental license authorizations

Research Program Experimental Licenses are Ill-Suited for CMRS Spectrum

- CMRS spectrum is intensely used, has high mobility users, continuous changing network technologies and very sensitive to external interference – *not suitable for conducting unproven radio experiments by third parties* – would result in harmful interference to existing and future CMRS services.
 - CMRS spectrum use is intense, pervasive, and growing year after year – CTIA Wireless year-end survey for December 2010:
 - 300 Million Users (96% Penetration), 2 Trillion Minutes, 2 Trillion Messages
 - 200 Billion MBytes, Data Traffic Growth Doubling Year after Year
 - Projected Data Traffic Growth ~ factor of 35 times (2009 to 2014)
 - 253,000 Cell Sites, Capital Investment \$25 Billion per year
 - Picocells, Distributed Antenna Systems (DAS), Signal Booster Systems
- CMRS provides critical Public Safety, E911 and other emergency services that must be protected from harmful interference.
 - Public Safety uses CMRS voice and broadband data communications
 - Priority Access Services (PAS) for federal, state & local agencies (Part 64.402)
 - E911 location system is very sensitive to interference – require reception of multiple CMRS signals at very low levels to locate emergency E911 callers

Research Program Experimental Licenses are Ill-Suited for CMRS Spectrum

- Universities and Health Care facilities located in urban areas – potential to impact a significant number of CMRS users
 - College dormitory residences rely upon CMRS as only source of voice service, and broadband data service – standard landline telephones rarely used by college students
 - Health Care facilities rely upon CMRS services for patient care – including doctors, nurses, staff, visitors and patients for emergencies
 - E911 and other public safety uses
- Such environments are not suitable for third party experimentation – intensely used critical licensed bands with mobile users
 - Would result in harmful interference to critical CMRS & E911 services
 - Third party program experimental licenses not appropriate, particularly 5 year terms

Coordination and Consent are Critical

- Coordination and licensee consent are necessary to protect CMRS from harmful interference
 - Commenting parties agree: CTIA, Qualcomm, Motorola, AT&T, Verizon, SIA, APCO, TIA, and WCIA
 - The experimental applicant and CMRS licensees must work together to ensure incumbent services are protected
 - Experimental applicant has to provide detail coordination information for licensee evaluation
 - Experimental applicant cannot determine extent of harmful interference that would occur, does not have sufficient information
 - Incumbent licensees do not have information on experiment plans & equipment
- Coordination and consent must be ongoing
 - CMRS makes frequent changes in technologies, system configurations, new cells, devices & services, migration over time
 - CDMA, EVDO, GSM, EDGE, UMTS, HSPA, LTE have different radio characteristics, bandwidths, frequencies, and sensitivities to interference
 - Experiments also changing over testing periods
 - Entire environment is dynamic, many changes over time, many unknowns, need to be cautious
- CMRS services in adjacent bands and markets also require protection
 - Experimental applicant must provide coordination information
 - Interference due to out-of-band emissions & receiver overload impacts adjacent band CMRS devices and base stations (i.e. near-far interference)
 - Interference beyond the experimental test areas impacts adjacent CMRS markets

Coordination and Consent are Critical

- Notification process needs to be open ended
 - Many unknowns – experiments use new & unproven air-interfaces, not well defined, not FCC type certified, not always compliant to standards – nature of experiment may be classified, proprietary, not entirely shared
 - Time to consult with system suppliers, allocate resources, analyze
 - May need to revise experiments to avoid interference
 - 30 days is the *minimum* requirement, other cases longer
 - Licensee consent is required in all cases
- Only practical way to avoid interference would require
 - Perform experiments in off-hour periods with lowest usage on network
 - Remove specific channels from service
 - Actively monitor system & services for signs of interference
 - Cease experiments immediately if interference occurs
 - Revise experiments to avoid interference, reassess ongoing
- Experiments in CMRS bands require significant ongoing coordination, evaluation, and consent – *represents a significant burden and distraction for incumbent licensees* – their engineering resources are required to operate, maintain and optimize their networks, and advance new technologies like LTE
 - Experiments should be limited in scope, area and time to minimize distractions to licensees and prevent interference to CMRS services

Power Flux Density Limits Will Not Protect CMRS

- Power flux density (PFD) limits will not protect existing & future services, will increase noise & interference levels in CMRS bands
 - Any increase in interference will disrupt CMRS and E911 services
 - CMRS operates at very low signal & noise levels
 - Advanced power control (1/1000 sec), signal processing techniques, MIMO antenna systems, low noise receivers – operate at low levels to optimize spectrum utilization
 - E911 location signals operate at very low levels – require reception of multiple signals at very low levels for the system to locate emergency E911 callers
 - CMRS E911 location systems use network based and handset based systems that receive and triangulate multiple weak signals from distant users for location
- Part 15 limits are not sufficient to protect CMRS and public safety services from harmful interference
 - Used for worst case, incidental, non-intentional radiation – actual levels normally much lower – not appropriate for intended signals to operate
 - Part 15 limits permit -79 dBm/MHz (Cell 800MHz) and -89 dBm/MHz (PCS 1950MHz) for Class B (residential) limits. Class A (commercial) limits permit even higher levels.
 - CMRS signals operate well *below* these Part 15 levels and would be overpowered (i.e. CDMA signals received at -100 dBm/MHz)
- PFD limits will not protect CMRS from harmful interference – must rely on licensee consent for experiments in CMRS bands

Suitable Bands for Radio Experimentation

- Radio experimentation is more suitable in unlicensed, shared licensed, or unused spectrum bands
 - These bands are unused or have some expectation of interference potential. Will not interfere with existing licensed services.
 - Radio experimentation involves new & unproven concepts, should occur in bands with non-critical services.

Suitable Bands for Radio Experimentation

- Unlicensed 2.4 GHz, 5.8 GHz & 900 MHz bands – used by Universities for research & experiments
- Shared licensed 3.6 GHz band
- Point-to-point fixed services in unlicensed & unused licensed bands
- TV white-space spectrum available in VHF & UHF bands
- Unused bands above 38 GHz – high frequency reduces interference range
- Unused and non-auctioned bands (i.e. designated for Innovation Zones)

Market Trials of Experimental Equipment

- Marketing Trials represent significant expansion of radio experimentation
 - Enforcement and control of potentially thousands of experimental devices
 - Should not be authorized to third parties without an agreement with licensee
 - Licensees need to manage use of spectrum and trial devices – to prevent harmful interference to existing services
- Marketing Trials require the following to avoid interference to CMRS:
 - Coordination & notification to adjacent bands & market CMRS licensees – minimum of 30 day prior notification
 - Limited in operation, scope, area, and duration to manage experimental devices
 - Maintain positive control of all experimental devices – ability to remotely shut down transmitters
 - Maintain central point of contact – immediately cease transmissions causing harmful interference
 - Tamper resistant radio devices – cannot be modified or hacked in ways causing interference to existing licensed services
 - Equipment type certification is not required, but should meet all FCC operational limits including power, emission, field strength
 - CMRS services in adjacent bands and markets also require protection
 - Upon completion of trial, enforcement and removal of all radio devices is required to clear the spectrum

Summary

- CMRS spectrum is intensely used, has high mobility users, not suitable for unproven radio experiments, which would result in harmful interference to existing CMRS services. CMRS bands provide critical Public Safety, E911 and other emergency services that must be protected from harmful interference.
- Therefore, the Commission should not authorize Research Program Experimental Licenses or Market Trials to third parties in licensed CMRS spectrum.
- Coordination and consent from incumbent licensees is critical to ensure existing services are protected from interference. Also, coordination with adjacent band and market CMRS licensees is required.
- PFD limits will not protect CMRS services from harmful interference – experiments will increase noise and interference levels in CMRS bands
- The Commission should consider other bands more suitable for researching, testing, and developing new and unproven technologies, which will not interfere with existing licensed services.



V-COMM is a leading provider of quality engineering and engineering consulting services to the worldwide wireless telecommunications industry with offices in Cranbury, NJ and Blue Bell, PA. V-COMM's engineering staff is experienced in Cellular, Personal Communications Services (PCS), Wireless Broadband Data, Enhanced Specialized Mobile Radio (ESMR), Paging, 2-Way radio, Microwave, and Broadcast Mobile TV networks. We have provided our expertise to wireless operators in engineering, system design, implementation, performance, optimization, and evaluation of new wireless technologies.

We have extensive experience in analyzing interference in various spectrum bands including Cellular, SMR, PCS, AWS, Air-to-ground, Public Safety, and 700 MHz spectrum. We have engineering experience in all commercial wireless technologies, including LTE, HSPA, UMTS, EVDO, CDMA, GSM, WiMAX, DVB-H, and Public Safety wireless technologies including analog and digital Project 25, EDACS, Opensky, and other trunking and conventional radio networks. Further, V-COMM was selected by the FCC & Department of Justice to provide expert analysis and testimony in the Nextwave and Pocket Communications Bankruptcy cases.

For additional information, visit V-COMM's web site at www.vcomm-eng.com.